



Fortis Garments Ltd. Extended Building

Holding No-100/1, Block B, Saheed Mosarraf Hossain Road,
Purbo Chandora, Sofipur, Kaliakoir, Gazipur.

(24.035969N, 90.270855E)

2nd September 2019





Observations



Column stresses above normal design limit

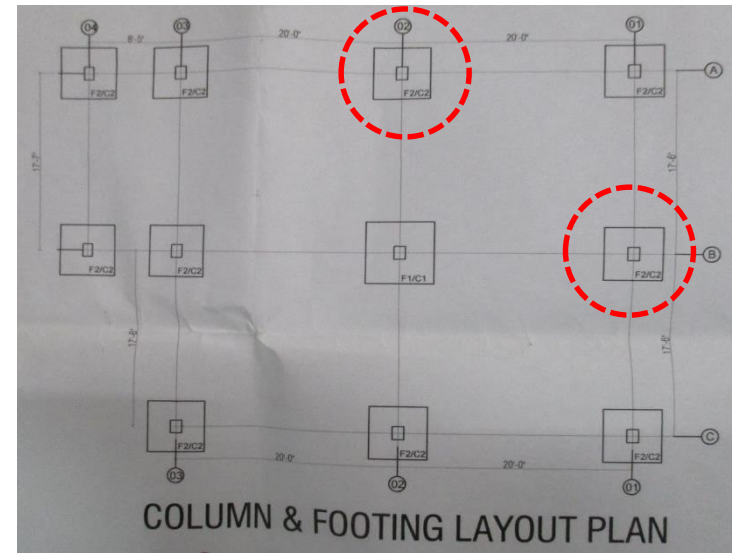
Observation: Sub-station Building



Partition walls



Periphery column



Cursory calculation shows that the peripheral columns are overstressed at ground level that exceeds the acceptable design limit. Detail Engineering Assessment (DEA) to be carried out based on in-situ concrete and rebar strength.



Loading on floor

Observation: Sub-station Building

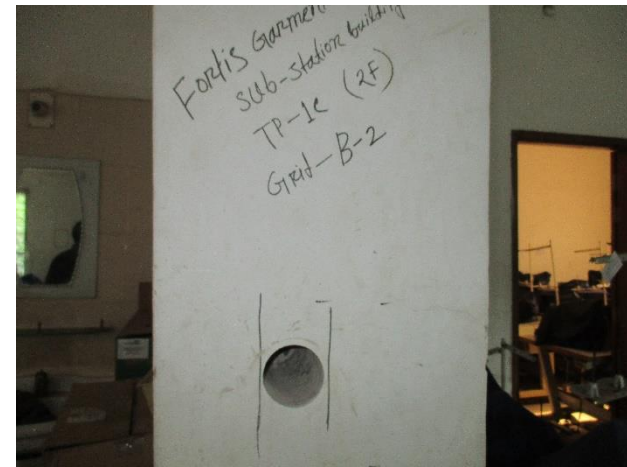


Concrete core holes remaining unfilled

Observation: Medical and Sub-station Building



Concrete core cutting from the column of Medical Building



Concrete core cutting from the column of Sub-station Building

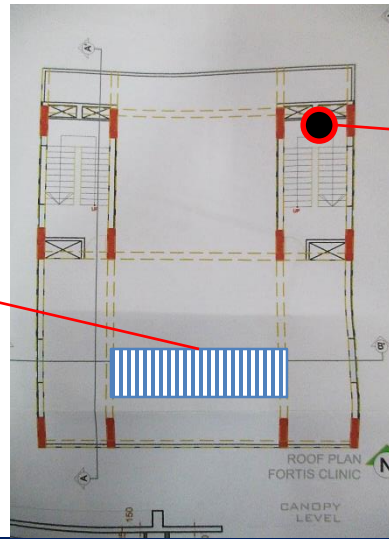
Concrete core samples have been taken from the column and beam of the Medical and Sub-station building. The void of core cutting had not been filled with proper materials. The factory is required to take immediate step to fill the voids.

Observation: Medical and Sub-station Building

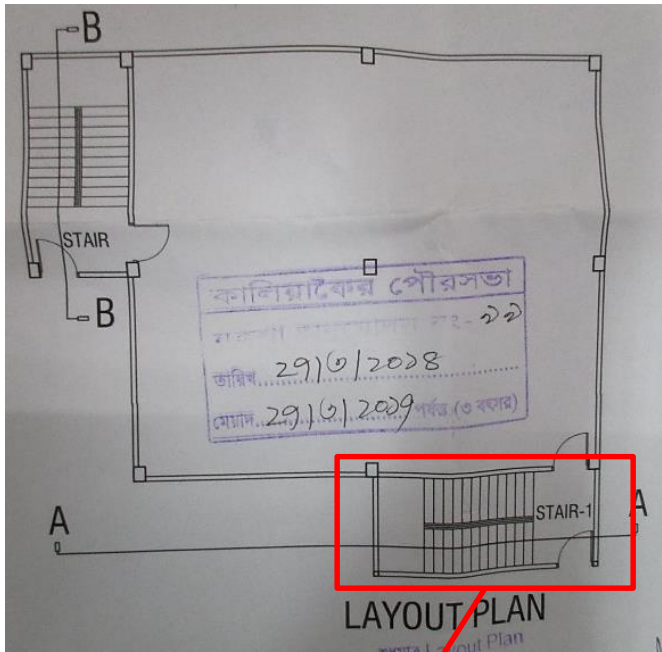


Lack of as-built documents

Observation: Medical and Sub-station Building



Undocumented lightweight roof and plastic water tank was observed on the roof of Medical Building.



There was no beam layout drawing for the Sub-station Building. Also, discrepancies were found between as-built condition and provided drawings.

Observation: Medical and Sub-station Building



No floor loading plan



Dining area of the Medical Building.



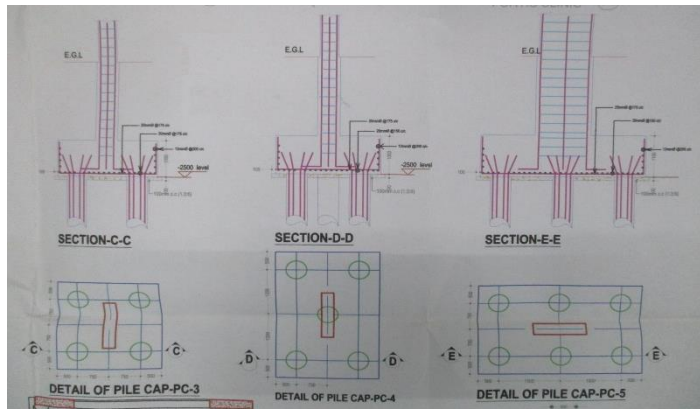
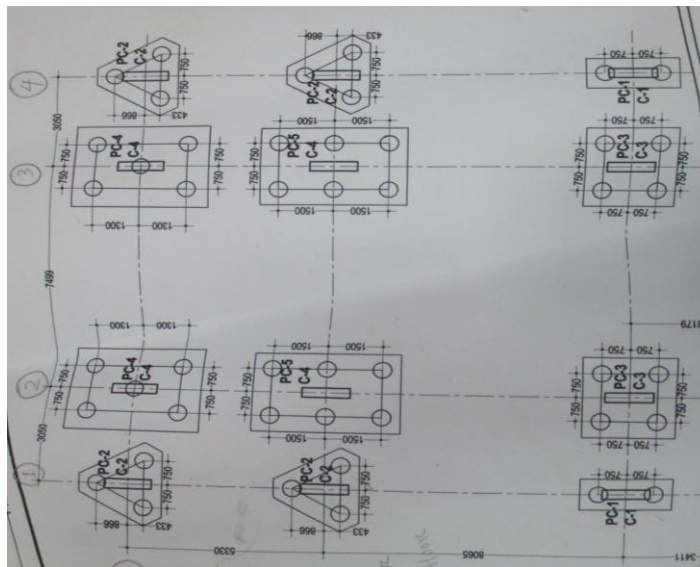
Store area in the Sub-station Building.

There was no floor loading plan for the Medical and Sub-station building. During inspection, floor loading more than 3 kPa was observed in the sub-station building. The factory is required to produce floor loading plan for each floor of the buildings.

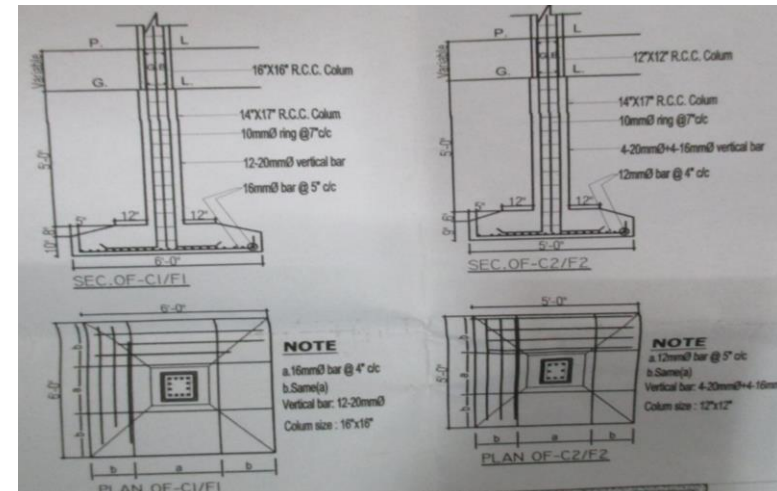
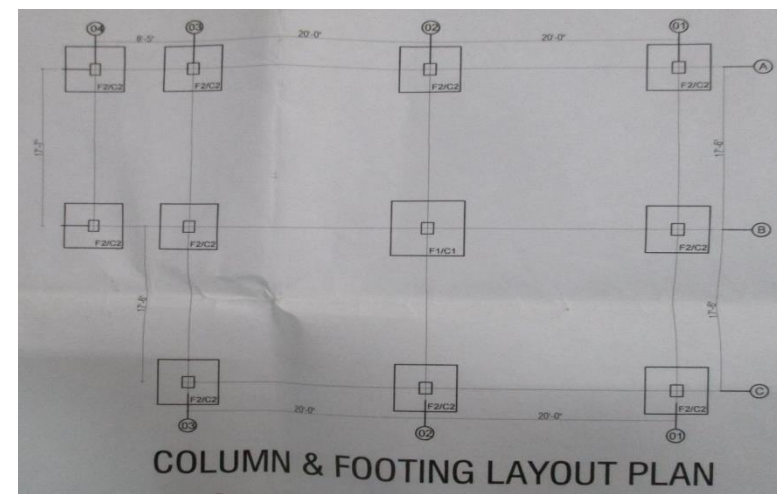
Observation: Medical and Sub-station Building



No soil investigation report



Foundation detail of Medical Building.



Foundation detail of Sub-station Building.

The soil investigation report was not available on site. So, the foundation capacity could not be verified. The factory is required to investigate the soil bearing capacity and verify the foundation adequacy accordingly.

Observation: Medical and Sub-station Building



Cantilever slab

Observation: Medical and Sub-station Building



1.75m cantilever slab on north side and 1.33m cantilever slab on east & west side on Medical Building.



1.2m cantilever slab on south side of Sub-station Building.

Cantilever slab was observed in both Medical and Sub-station Building. The factory is required to check the adequacy of the slab for the imposed loading.

Observation: Medical and Sub-station Building



Lightweight roofing

Observation: Medical and Sub-station Building



Lightweight roof on Medical Building



Lightweight roof on Sub-station Building

The part of roof of Medical building made by wooden frame. And the roof of Sub-station building made by steel angle. Both lightweight roof appears to be non-engineered. The factory engineer is required to investigate and replace the wooden frame with engineered structure (if necessary). Also, check the adequacy steel frame and their connections for the uplift forces.

Observation: Medical and Sub-station Building



Water ponding and dampness

Observation: Medical and Sub-station Building



Water ponding was observed on the roof of Medical Building.



Sign of water damage of Medical Building.



Water ponding was observed on the roof and dampness was observed on wall. Building engineer to apply proper repair method.

Observation: Medical and Sub-station Building



Priority Actions



Problems Observed

Sub-station Building:

1: Column stresses above normal design limit

Medical and Sub-station Building:

2: Concrete core hole remaining unfilled

3: Lack of as-built documents

4: No floor loading plan

5: No soil investigation report

6: Cantilever slab

7: Lightweight roofing

8: Water ponding and dampness



Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Column stresses above normal design limit (Sub-station Building)	Maintain floor live loading below 2 kPa.	6-weeks
2	Column stresses above normal design limit (Sub-station Building)	Building Engineer to review design, loads and stresses in all columns at ground floor level as part of a Detailed Engineering Assessment (DEA).	6-weeks
3	Column stresses above normal design limit (Sub-station Building)	Produce and actively manage a loading plan for all floor plates considering slab, beam, column and foundation capacity.	6-weeks
4	Column stresses above normal design limit (Sub-station Building)	Carry out remedial works as outcome of DEA.	6-months
5	Column stresses above normal design limit (Sub-station Building)	Continue to implement floor load plan.	6-months
6	Concrete core hole remaining unfilled (Medical and Sub-station Building)	Fill the void in the concrete column and beams with appropriate filling material.	Immediate - Now
7	Concrete core hole remaining unfilled (Medical and Sub-station Building)	The factory engineer is required to produce core location layout drawings for the buildings.	6-weeks



Detail Engineering Assessment

This Schedule develops a minimum level of information, Analysis and testing expected as part of a Detail Engineering Assessment.

The Building(s) have been visually assessed and it is deemed necessary that a detailed engineering assessment be carried out by a competent Engineering Team employed by the factory Owner.

This Request should be read in conjunction with the ACCORD DEA guideline , ACCORD standard for Assessment of Structural Integrity of Existing RMG Factory Buildings in Bangladesh (Tripartite Document), the latest version of these document should be referenced. These document also gives guidance on required competency of Engineering Team.

We expect that the following will be carried out:

1. Development of Full Engineering As-Built Drawings showing Structure, loading, elements, dimensions , levels, foundations and framing on Plan, Section and Elevation drawings .
2. The Engineering team are to carry out supporting calculations with a model based design check to assess the safety and serviceability of the building against loading as set out in BNBC-2006, Lower rate provisions can be applied in accordance with the ACCORD DEA guideline , ACCORD standard following international engineering practice, justification for these lower rate provisions must be made.
3. A geotechnical Report describing ground conditions and commenting on foundation systems used/proposed.
4. A report on Engineering tests carried out to justify material strengths and reinforcement content in all key elements studied see ACCORD DEA guideline & ACCORD standard more details.
5. Detailed load plans shall be prepared for each level showing current and potential future loading with all key equipment items shown with associated loads.
6. The Engineering team will prepare an assessment report that covers the following:
 - As-Built drawings including
 - Plans at each level calling up and dimensioning all structural components
 - Cross sectional drawings showing structural beams, slabs, floor to floor heights, roof build-ups and Basic design information of the structure
 - Highlight any variation between As-built compared to the designed structure
 - Results of testing for strength and materials
 - Results of geotechnical assessment and testing/investigation
 - Details of loading, inputs and results of computer modelling
 - Commentary on adequacy/inadequacy of elements of the structure
 - Schedule of any required retrofitting required for safety or performance of Structure

Any proposals for Retrofitting to follow guidance developed in the ACCORD DEA guideline & ACCORD standard (<http://bangladeshaccord.org/factories/resource-centre/>).



Item No.	Observation	Recommended Action Plan	Recommended Timeline
8	Lack of as-built documents (Medical and Sub-station Building)	The factory engineer is required to survey the structures and produce as-built drawings for the buildings.	6-weeks
9	No floor loading plan (Medical and Sub-station Building)	The factory engineer is required to produce floor loading plan for each floor considering floor, column and foundation capacity.	6-weeks
10	No floor loading plan (Medical and Sub-station Building)	Implement the floor loading plan with proper sign and instructions.	6-months
11	No soil investigation report (Medical and Sub-station Building)	The factory is required to investigate the bearing capacity of soil for the buildings.	6-weeks
12	No soil investigation report (Medical and Sub-station Building)	Verify the foundation adequacy of the buildings.	6-weeks
13	No soil investigation report (Medical and Sub-station Building)	Implement remedial actions, as necessary.	6-months
14	Cantilever slab (Medical and Sub-station Building)	The factory is required to check the adequacy of the cantilever slab.	6-weeks
15	Cantilever slab (Medical and Sub-station Building)	Implement remedial actions, as necessary.	6-months



Item No.	Observation	Recommended Action Plan	Recommended Timeline
16	Lightweight roofing (Medical and Sub-station Building)	The factory engineer is required to investigate and replace the wooden frame with engineered structure if required.	6-weeks
17	Lightweight roofing (Medical and Sub-station Building)	The factory engineer is required to check the adequacy of steel frame and their connections for the uplift forces.	6-weeks
18	Lightweight roofing (Medical and Sub-station Building)	Implement the remedial works as recommended.	6-months
19	Water ponding and dampness (Medical and Sub-station Building)	Improve drainage system on roof with adequate slope.	6-weeks
20	Water ponding and dampness (Medical and Sub-station Building)	The factory engineer is required to investigate the damaged area and suggest proper remedial actions.	6-weeks
21	Water ponding and dampness (Medical and Sub-station Building)	Implement remedial actions, as necessary.	6-months